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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,684	03/18/2004	Franz X. Zach	FIS920040007	2683

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EXAMINER
LEVIN, NAUM B

ART UNIT	PAPER NUMBER
2825	

DATE MAILED: 04/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	**Applicant(s)**
Office Action Summary	10/708,684	ZACH, FRANZ X.
	Examiner	**Art Unit**
	Naum B. Levin	2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2004*.

2a)☐ This action is **FINAL.** 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *03/18/2004*.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____ .

DETAILED ACTION

1. This office action is in response to Application 10/708,684 filed on 03/18/2004.

Claims 1-20 remain pending in the Application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 7-18 and 20 are rejected under 35 U.S.C. 102(b) as being

unpatentable by Liebmann et al. (US Patent 5,537,648).

3. As to claims 1, 8 and 14 Liebmann describes:

(1) A method of designing a layout of an integrated circuit using an alternating

phase shift mask, the method comprising the steps of (col.3, II.40-43; col.4, II.37-41):

providing at least two design objects for designing a phase-shiftable feature in

the layout (CAD system which is capable of receiving as input data existing VLSI circuit

designs –col.3, II.43-45; CAD system uses a series of basic geometric operations to

design areas requiting phase assignment ... This process allows automatic generation

of phase shift mask data from any circuit design that allows for phase shifting ... any

designable circuit layout can be phase shifted with this algorithm – col.3, II.48-61)), each

design object including (col.3, II.43-46; col.3, II.48-61; col.3, II.48-61):

a base shape (locating the features that need a phase transition – col.3,

II.62-63; original critical shape-col.4, I.3) (col.3, II.62-63; col.4, I.3),

a first phase shape identifier assigned to a first portion of the base shape (phase regions are created by expanding the critical features- col.3, ll.64-65; phase assignment unique to each critical feature and define "runs" of interrelated critical features: By tagging each phase region as "left"-col.4, ll.18-20), the first phase shape identifier having a first type (Tagging is shown in FIG. 10 with the convention that a "left" phase region is hatched with lines at 45.degree.- col.6, ll.24-26) (col.3, ll.64-67; col.4, ll.1-3; col.4, ll.18-21; col.6, ll.21-27), and

a second phase shape identifier assigned to a second portion of the base shape (phase assignment unique to each critical feature and define "runs" of interrelated critical features: By tagging each phase region as "right"-col.4, ll.18-20;, the second phase shape identifier having a second different type (a "right" phase region is hatched with lines at 135.degree.-col.6, ll.26-27) (col.3, ll.64-67; col.4, ll.1-3; col.4, ll.18-21; col.6, ll.21-27); and

allowing placement of the design object overlapping another design object during design of the layout only in the case that the types of any overlapping phase shape identifiers are compatible (Merging all overlapping phase regions ensures unique phase assignment to each region-col.4, ll.3-4);

(8) A computer program product comprising a computer useable medium having computer readable program code embodied therein for designing an integrated circuit layout using an alternating phase shift mask, the program product comprising (col.3, ll.40-43; col.4, ll.37-41; col.5, ll.30-41):

program code configured to provide at least two design objects for designing a

phase-shiftable feature in the layout (CAD system which is capable of receiving as input

data existing VLSI circuit designs –col.3, ll.43-45; CAD system uses a series of basic

geometric operations to design areas requiting phase assignment ... This process

allows automatic generation of phase shift mask data from any circuit design that allows

for phase shifting ... any designable circuit layout can be phase shifted with this

algorithm – col.3, ll.48-61)), each design object including (col.3, ll.43-46; col.3, ll.48-61;

col.3, ll.48-61):

a base shape (locating the features that need a phase transition – col.3,

ll.62-63; original critical shape-col.4, l.3) (col.3, ll.62-63; col.4, l.3),

a first phase shape identifier assigned to a first portion of the base shape

(phase regions are created by expanding the critical features- col.3, ll.64-65; phase

assignment unique to each critical feature and define "runs" of interrelated critical

features: By tagging each phase region as "left"-col.4, ll.18-20), the first phase shape

identifier having a first type (Tagging is shown in FIG. 10 with the convention that a "left"

phase region is hatched with lines at 45.degree.- col.6, ll.24-26) (col.3, ll.64-67; col.4,

ll.1-3; col.4, ll.18-21; col.6, ll.21-27), and

a second phase shape identifier assigned to a second portion of the

base shape (phase assignment unique to each critical feature and define "runs" of

interrelated critical features: By tagging each phase region as "right"-col.4, ll.18-20;, the

second phase shape identifier having a second different type (a "right" phase region is

hatched with lines at 135.degree.-col.6, II.26-27) (col.3, II.64-67; col.4, II.1-3; col.4, II.18-21; col.6, II.21-27); and

program code configured to allow placement of the design object overlapping another design object during design of the layout only in the case that the types of any overlapping phase shape identifiers are compatible (Merging all overlapping phase regions ensures unique phase assignment to each region-col.4, II.3-4);

(14) An integrated circuit design system comprising (col. 3, II.40-46; col.4, II.37-41):

means for providing at least two design objects for designing a phase-shiftable feature in the layout (CAD system which is capable of receiving as input data existing VLSI circuit designs –col.3, II.43-45; CAD system uses a series of basic geometric operations to design areas requiting phase assignment ... This process allows automatic generation of phase shift mask data from any circuit design that allows for phase shifting ... any designable circuit layout can be phase shifted with this algorithm – col.3, II.48-61)), each design object including (col.3, II.43-46; col.3, II.48-61; col.3, II.48-61):

a base shape (locating the features that need a phase transition – col.3, II.62-63; original critical shape-col.4, I.3) (col.3, II.62-63; col.4, I.3),

a first phase shape identifier assigned to a first portion of the base shape (phase regions are created by expanding the critical features- col.3, II.64-65; phase assignment unique to each critical feature and define "runs" of interrelated critical features: By tagging each phase region as "left"-col.4, II.18-20), the first phase shape

identifier having a first type (Tagging is shown in FIG. 10 with the convention that a "left"

phase region is hatched with lines at 45.degree.- col.6, ll.24-26) (col.3, ll.64-67; col.4,

ll.1-3; col.4, ll.18-21; col.6, ll.21-27), and

a second phase shape identifier assigned to a second portion of the

base shape (phase assignment unique to each critical feature and define "runs" of

interrelated critical features: By tagging each phase region as "right"-col.4, ll.18-20;, the

second phase shape identifier having a second different type (a "right" phase region is

hatched with lines at 135.degree.-col.6, ll.26-27) (col.3, ll.64-67; col.4, ll.1-3; col.4, ll.18-

21; col.6, ll.21-27); and

means to allow placement of the design object overlapping another design object

during design of the layout only in the case that the types of any overlapping phase

shape identifiers are compatible (Merging all overlapping phase regions ensures unique

phase assignment to each region-col.4, ll.3-4).

4.   As to claims 2-5, 7, 9-13, 15-18 and 20 Liebmann recites:

(2), (9), (15) The method/program/system further comprising the step of allowing

placement of a design object adjacent another design object (col.3, ll.62-67; col.4, ll.1-3;

col.6, ll.21-45);

(3), (10), (16) The method/program/system, wherein each portion is a side of a

respective base shape (col.6, ll.21-45);

(4), (11), (17) The method/program/system, wherein the base shape includes a

line (col.3, ll.62-67; col.4, ll.1-3; col.6, ll.21-45);

(5), (12), (18) The method/system, wherein each phase shape identifier indicates

a requisite mask area (col.3, ll.64-67; col.4, ll.1-3; col.4, ll.18-21; col.6, ll.21-27);

(7) The method further comprising the step of providing a design shape for

designing a non-phase-shiftable feature in the layout (col.6, ll.49-51);

(13) The program product of claim 8, further comprising program code

configured to provide a plurality of design shapes (col.1, ll.5-14).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 6 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable by

Liebmann (648) in view of Liebmann et al. (US Patent 6,057,063).

With respect to claims 6 and 19 Liebmann (648) teaches the features above but

lacks a method/system of designing a layout of an integrated circuit using an alternating

phase shift mask, wherein each phase shape identifier indicates a color of phase-shift

required for the base shape.

6. As to claim 6 and 19 Liebmann (063) in view of Liebmann (648) recites:

The method/system, wherein each phase shape identifier indicates a color of

phase-shift required for the base shape (col.7, ll.1-21; col.13, ll.4-10).

It would have been obvious to a person of ordinary skills in the art at the time the invention was made to employ Liebmann's (063) teaching regarding the method/system of designing the layout of the integrated circuit using the alternating phase shift mask, wherein each phase shape identifier indicates the color of phase-shift required for the base shape and use in Liebmann's (648) to represent to designer two different types of the phase identifiers using two different colors instead of hatching lines at different degrees, thereby distinguishing different types of the phase identifiers for the designer in more readable format.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Naum B. Levin whose telephone number is 571-272-1898. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Chiang can be reached on 571-272-7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

N L

Armando

THUAN DO

Primary examiner

4/07/06